General

Guideline Title

Evidence-based guideline update: treatment of essential tremor. Report of the Quality Standards Subcommittee of the American Academy of Neurology.

Bibliographic Source(s)

Zesiewicz TA, Elble RJ, Louis ED, Gronseth GS, Ondo WG, Dewey RB Jr, Okun MS, Sullivan KL, Weiner WJ. Evidence-based guideline update: treatment of essential tremor: report of the quality standards subcommittee of the American Academy of Neurology. Neurology. 2011 Nov 8;77(19):1752-5. PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Zesiewicz TA, Elble R, Louis ED, Hauser RA, Sullivan KL, Dewey RB Jr, Ondo WG, Gronseth GS, Weiner WJ. Practice parameter: therapies for essential tremor: report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology 2005 Jun 28;64(12):2008-20.

Recommendations

Major Recommendations

Definitions of the strength of the recommendations (A, B, C, and U) and classification of the evidence (Class I-IV) are provided at the end of the "Major Recommendations" field.

New Recommendations for Treatment of Essential Tremor (ET)

Levetiracetam and 3,4-diaminopyridine should not be considered for treatment of limb tremor in ET (Level B).

Clinicians may choose not to consider flunarizine for treatment of limb tremor in ET (Level C).

The evidence is insufficient to make recommendations regarding the use of pregabalin, zonisamide, or clozapine (Level U).

Conclusions and recommendations for the use of propranolol, primidone (Level A, established as effective); alprazolam, atenolol, gabapentin (monotherapy), sotalol, topiramate (Level B, probably effective); nadolol, nimodipine, clonazepam, botulinum toxin A, deep brain stimulation, thalamotomy (Level C, possibly effective); and gamma knife thalamotomy (Level U, insufficient evidence) are unchanged from the previous guideline (see the summary tables below).

Pharmacologic Treatment of ET

The previous recommendations with some modifications are summarized in the following table:

Recommendations for Use	Treatment
Level A – should be offered to patients who desire treatment for limb tremor in ET, depending on concurrent medical conditions and potential side effects	Primidone Propranolol Propranolol LA
Level B – probably effective and should be considered to reduce *limb* tremor in ET	Alprazolam Atenolol Gabapentin (monotherapy) Sotalol Topiramate
Level B – probably effective and should be considered to reduce *head* tremor in ET	Propranolol
Level C – possibly effective and may be considered to reduce limb tremor associated with ET	Botulinum toxin A injection of forearm muscles Clonazepam Nadolol Nimodipine
Recommendations Against Use	Treatment
Level B – probably do not reduce limb tremor in ET and should not be considered for treatment of limb tremor in ET	3,4-diaminopyridine* Acetazolamide Isoniazid Levetiracetam* Pindolol Trazodone
Level C – possibly do not reduce limb tremor in ET and may not be considered for treatment of limb tremor in ET	Flunarizine* Methazolamide Mirtazapine Nifedipine Verapamil
Level U – Insufficient evidence to support or refute efficacy in treating ET	Amantadine Clonidine Clozapine* Gabapentin (adjunct therapy) Glutethimide L-tryptophan/pyridoxine Metoprolol Nicardipine Olanzapine* Oxcarbazepine Phenobarbital Pregabalin* Quetiapine Sodium oxybate (in ethanol-sensitive ET) Theophylline Tiagabine Zonisamide*
*The conclusion and recommendation are new or different from those in the previous guideline.	

Surgical Treatment of ET

The previous recommendations are summarized in the following table:

Recommendations for Use	Treatment
Level C – effectively treats contralateral limb tremor in ET that is refractory to medication management	Unilateral thalamotomy DBS of the VIM of the thalamus
Level U – insufficient evidence to support or refute efficacy in treating ET	Superiority of DBS or thalamotomy for the treatment of ET Relative advantages and disadvantages of unilateral vs bilateral DBS in the treatment of limb tremor Direct subthalamic stimulation and/or zona incerta/prelemniscal stimulation Gamma knife thalamotomy
DBS, deep brain stimulation; VIM, ventral intermediate nucleus	

Definitions:

Classification of Recommendations

A = Established as effective, ineffective, or harmful (or established as useful/predictive or not useful/predictive) for the given condition in the specified population (Level A rating requires at least two consistent Class I studies.*)

B = Probably effective, ineffective, or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population (Level B rating requires at least one Class I study or at least two consistent Class II studies.)

C = Possibly effective, ineffective, or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population (Level C rating requires at least one Class II study or two consistent Class III studies.)

U = Data inadequate or conflicting given current knowledge, treatment (test, predictor) is unproven.

*In exceptional cases, one convincing Class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large (relative rate improved outcome >5 and the lower limit of the confidence interval is >2)

American Academy of Neurology (AAN) Classification of Evidence for Rating of a Therapeutic Article

Class I: A randomized, controlled clinical trial of the intervention of interest with masked of objective outcome assessment, in a representative population. Relevant baseline characteristics are presented and substantially equivalent among treatment groups or there is appropriate statistical adjustment for differences. The following are also required:

a. Concealed allocation
b. Primary outcome(s) clearly defined
c. Exclusion/inclusion criteria clearly defined
d. Adequate accounting for drop-outs (with at least 80% of enrolled subjects completing the study) and crossovers with numbers sufficiently low to have minimal potential for bias
e. For noninferiority or equivalence trials claiming to prove efficacy for one or both drugs, the following are also required*:
    1. The authors explicitly state the clinically meaningful difference to be excluded by defining the threshold for equivalence or noninferiority.
    2. The standard treatment used in the study is substantially similar to that used in previous studies establishing efficacy of the standard treatment (e.g., for a drug, the mode of administration, dose and dosage adjustments are similar to those previously shown to be effective).
    3. The inclusion and exclusion criteria for patient selection and the outcomes of patients on the standard treatment are comparable to

those of previous studies establishing efficacy of the standard treatment.
4. The interpretation of the results of the study is based upon a per protocol analysis that takes into account dropouts or crossovers.

Class II: A randomized controlled clinical trial of the intervention of interest in a representative population with masked or objective outcome assessment that lacks one criteria a-e above or a prospective matched cohort study with masked or objective outcome assessment in a representative population that meets b-e above. Relevant baseline characteristics are presented and substantially equivalent among treatment groups or there is appropriate statistical adjustment for differences.

Class III: All other controlled trials (including well-defined natural history controls or patients serving as own controls) in a representative population, where outcome is independently assessed or independently derived by objective outcome measurement.**

Class IV: Studies not meeting Class I, II or III criteria including consensus or expert opinion.

*Note that numbers 1-3 in Class Ie are required for Class II in equivalence trials. If any one of the three is missing, the class is automatically downgraded to Class III.
**Objective outcome measurement: an outcome measure that is unlikely to be affected by an observer's (patient, treating physician, investigator) expectation or bias (e.g., blood tests, administrative outcome data).

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Essential tremor (ET)

Guideline Category

Assessment of Therapeutic Effectiveness

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Neurological Surgery

Neurology

Intended Users

Health Plans

Hospitals

Managed Care Organizations

Physician Assistants

Physicians

Guideline Objective(s)

To update the 2005 American Academy of Neurology practice parameter on the treatment of essential tremor (ET)

Target Population

Patients with essential tremor (ET)

Interventions and Practices Considered

Pharmacologic Treatment

1. Propranolol
2. Propranolol LA
3. Primidone
4. Alprazolam
5. Atenolol
6. Gabapentin monotherapy
7. Sotalol
8. Topiramate
9. Clonazepam
10. Nadolol
11. Nimodipine
12. Botulinum toxin A

Note: The following were considered but not recommended: 3,4-diaminopyridine, clozapine, trazodone, acetazolamide, isoniazid, levetiracetam, pindolol, flunarizine, methazolamide, mirtazapine, nifedipine, verapamil, amantadine, clonidine, gabapentin as adjunct therapy, glutethimide, L-tryptophan/pyridoxine, metoprolol, nicardipine, olanzapine, oxcarbazepine, phenobarbital, pregabalin, quetiapine, sodium oxybate in ethanol-sensitive ET, theophylline, tiagabine, zonisamide

Nonpharmacologic (Surgical) Therapy

1. Chronic thalamic deep brain stimulation (DBS) of the ventral intermediate nucleus (recommended for limb tremor)
2. Unilateral thalamotomy
3. Considered but not recommended
    - Bilateral DBS
    - Direct subthalamic stimulation and/or zona incerta/prelemniscal stimulation
    - Gamma knife thalamotomy

Major Outcomes Considered

- Change in tremor rating scale scores
- Change in quality of life scores

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

The American Academy of Neurology (AAN) invited neurologists with expertise in essential tremor (ET) to perform the review. Computer-assisted literature searches were conducted for relevant English-language articles pertinent to the treatment of ET. The MEDLINE, EMBASE, Science Citation Index, and CINAHL databases were searched from the years 2004 to 2010. The following key words and phrases were used in the initial search and were paired with the term "essential tremor." Both brand and generic names were used in the searches (generic names only are listed): acetazolamide, alprazolam, amantadine, aminophylline, antiepileptics, arotinolol, atenolol, atypical neuroleptics, beta-adrenergic blockers, benzodiazepines, botulinum toxin A, botulinum toxin B, calcium channel blockers, carbonic anhydrase inhibitors, carisbamate, chemodenervation, clinical trials, clonazepam, clonidine, clozapine, deep brain stimulation (DBS), electroconvulsive therapy, flunarizine, gabapentin, gamma knife surgery, glutethimide, hypnotics, isoniazid, levetiracetam, management, methazolamide, metoprolol, mirtazapine, nadolol, nicardipine, nifedipine, nimodipine, octanol, olanzapine, oxcarbazepine, phenobarbital, pindolol, pregabalin, primidone, propranolol, propranolol long-acting, sodium oxybate, topiramate, zonisamide, quetiapine, research design, sotalol, stereotactic surgery, thalamotomy, theophylline, therapy, trazodone, verapamil, and VIM thalamic stimulation. Articles related to dystonia, dystonic tremor, myoclonus, cerebellar tremor, "atypical tremor," Parkinson disease (PD), parkinsonism, orthostatic tremor, palatal tremor, primary writing tremor, animal models of ET, pathophysiology, genetics, epidemiology, cognitive dysfunction, quality of life, social phobia, and neuropsychiatric testing in ET were excluded from the review.

The search identified 589 articles pertaining to the treatment of ET, the titles and abstracts of which were each reviewed by at least 2 committee members. Articles were accepted for further review if they consisted of controlled trials, observational studies, cohort studies, open-label studies, or case series. Of the 589 articles, 252 were reviewed in their entirety.

Number of Source Documents

252 articles were reviewed in their entirety

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

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b. Primary outcome(s) clearly defined
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    1. The authors explicitly state the clinically meaningful difference to be excluded by defining the threshold for equivalence or noninferiority.
    2. The standard treatment used in the study is substantially similar to that used in previous studies establishing efficacy of the standard treatment (e.g., for a drug, the mode of administration, dose and dosage adjustments are similar to those previously shown to be effective).
    3. The inclusion and exclusion criteria for patient selection and the outcomes of patients on the standard treatment are comparable to those of previous studies establishing efficacy of the standard treatment.
    4. The interpretation of the results of the study is based upon a per protocol analysis that takes into account dropouts or crossovers.

Class II: A randomized controlled clinical trial of the intervention of interest in a representative population with masked or objective outcome assessment that lacks one criteria a-e above or a prospective matched cohort study with masked or objective outcome assessment in a representative population that meets b-e above. Relevant baseline characteristics are presented and substantially equivalent among treatment

groups or there is appropriate statistical adjustment for differences.

Class III: All other controlled trials (including well-defined natural history controls or patients serving as own controls) in a representative population, where outcome is independently assessed or independently derived by objective outcome measurement.**

Class IV: Studies not meeting Class I, II or III criteria including consensus or expert opinion.

*Note that numbers 1-3 in Class Ie are required for Class II in equivalence trials. If any one of the three is missing, the class is automatically downgraded to Class III.
**Objective outcome measurement: an outcome measure that is unlikely to be affected by an observer's (patient, treating physician, investigator) expectation or bias (e.g., blood tests, administrative outcome data).

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Classification of Recommendations

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B = Probably effective, ineffective, or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population (Level B rating requires at least one Class I study or at least two consistent Class II studies.)

C = Possibly effective, ineffective, or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population (Level C rating requires at least one Class II study or two consistent Class III studies.)

U = Data inadequate or conflicting given current knowledge, treatment (test, predictor) is unproven.

*In exceptional cases, one convincing Class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large (relative rate improved outcome >5 and the lower limit of the confidence interval is >2)

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Drafts of the updated guideline have been reviewed by at least three American Academy of Neurology (AAN) committees, a network of neurologists, *Neurology* peer reviewers and representatives from related fields.

This guideline was approved by the Quality Standards Subcommittee on November 13, 2010; by the Practice Committee on May 23, 2011; and by the AAN Board of Directors on August 13, 2011.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate treatment of essential tremor

Potential Harms

Adverse events of medications

Qualifying Statements

Qualifying Statements

This statement is provided as an educational service of the American Academy of Neurology (AAN). It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all of the circumstances involved. The clinical context section is made available in order to place the evidence-based guideline(s) into perspective with current practice habits and challenges. No formal practice recommendations should be inferred.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

Quick Reference Guides/Physician Guides

Resources

Slide Presentation

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Zesiewicz TA, Elble RJ, Louis ED, Gronseth GS, Ondo WG, Dewey RB Jr, Okun MS, Sullivan KL, Weiner WJ. Evidence-based guideline update: treatment of essential tremor: report of the quality standards subcommittee of the American Academy of Neurology. Neurology. 2011 Nov 8;77(19):1752-5. PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2005 Jun (revised 2011 Nov 8)

Guideline Developer(s)

American Academy of Neurology - Medical Specialty Society

Source(s) of Funding

American Academy of Neurology (AAN)

Guideline Committee

Quality Standards Subcommittee

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Conflicts of Interest

The American Academy of Neurology (AAN) is committed to producing independent, critical and truthful clinical practice guidelines (CPGs). Significant efforts are made to minimize the potential for conflicts of interest to influence the recommendations of this CPG. To the extent possible, the AAN keeps separate those who have a financial stake in the success or failure of the products appraised in the CPGs and the developers of the guidelines. Conflict of interest forms were obtained from all authors and reviewed by an oversight committee prior to project initiation. AAN limits the participation of authors with substantial conflicts of interest. The AAN forbids commercial participation in, or funding of, guideline projects.

Financial Disclosures

Dr. Zesiewicz serves on the speakers' bureau for and has received funding for travel and speaker honoraria from Teva Pharmaceutical Industries Ltd.; serves on the editorial board of *Tremor and Other Hyperkinetic Movement Disorders*; serves/has served as a consultant for Boehringer Ingelheim, Teva Pharmaceutical Industries Ltd., Allergan, Inc., UCB, and Novartis; is listed as an inventor on a provisional patent on the use of nicotinic modulators in treating ataxia and imbalance held by the University of South Florida; and receives/has received research support from Pfizer Inc, the National Ataxia Foundation, the Friedreich's Ataxia Research Association, and the Bobby Allison Ataxia Research Center. Dr. Elble serves on the scientific advisory board for the International Essential Tremor Foundation; has received funding for travel from the Movement Disorders Society; receives research support from GlaxoSmithKline, Teva Pharmaceutical Industries Ltd., Pfizer Inc, Phytopharm, Janssen (Ortho-McNeil), the NIH/NINDS, and the Spastic Paralysis Research Foundation of Kiwanis International; and has acted as an expert witness in a medico-legal proceeding. Dr. Louis has received honoraria from the American Academy of Neurology (AAN); receives research support from the NIH/NINDS and the Parkinson's Disease Foundation; and has served as a legal consultant on epidemiologic issues. Dr. Gronseth serves on the editorial advisory board of *Neurology Now*, serves on the speakers' bureau for Boehringer Ingelheim, and receives research support from the AAN. Dr. Ondo has received speaker honoraria from GlaxoSmithKline, Boehringer Ingelheim, Allergan, Inc., Teva Pharmaceutical Industries Ltd., Novartis, Ipsen, Merz Pharmaceuticals, LLC, and Lundbeck Inc.; serves on the editorial board of *Tremor and Other Hyperkinetic Movements*; receives publishing royalties for *Restless Legs Syndrome: Diagnosis and Treatment* (Informa, 2008) and *Handbook of Movement Disorders* (Wiley-Blackwell, 1998); and has received research support from Takeda Pharmaceutical Company Limited, ACADIA Pharmaceuticals, Ipsen, IMPAX Laboratories, Inc., XenoPort, Inc., Bayer Schering Pharma, and Allergan, Inc. Dr. Dewey serves on the speakers' bureaus for and has received funding for travel and speaker honoraria from Teva Pharmaceutical Industries Ltd., GlaxoSmithKline, Ipsen, Boehringer Ingelheim, and Allergan Inc.; serves as a consultant for Teva Pharmaceutical Industries Ltd.; receives research support from the NIH; and has served as an expert witness in a medico-legal case. Dr. Okun serves on scientific advisory boards for the Dystonia Medical Research Foundation and the National Parkinson Foundation and the Medical Advisory Board for the Tourette Syndrome Association; has received funding for travel and speaker honoraria from Medtronic, Inc. prior to 2010; has served/serves on the editorial boards of *Neurology®* and *Parkinsonism and Related Disorders*; is a founder of the COMPRESS software used for deep brain stimulation (DBS) screening and has filed patents regarding double lead DBS, DBS targeting, and COMPRESS; receives royalties from the publication of *Ultimate Neurology Review* (DEMOS, 2007), *Parkinson's Disease* (Manson, 2009), and *Deep Brain Stimulation for Neurological and Psychiatric Diseases* (Humana Press, 2009); serves as Medical Director of the National Parkinson Foundation and as a member of the Ask the Expert Forum; and has received research support from Medtronic, Inc. (devices and training fellowship grants), the NIH, the University of Florida Foundation, the Parkinson Alliance, the Michael J. Fox Foundation, and the National Parkinson Foundation. K.L. Sullivan reports no disclosures. Dr. Weiner has

served on scientific advisory boards for Santhera Pharmaceuticals and Rexahn Pharmaceuticals, Inc.; serves on the editorial boards of *Parkinsonism and Related Disorders* and *Neurological Reviews* and as Editor of *Treatment Options in Neurology*; receives royalties from the publication of *Neurology for the Non-Neurologist* (6th edition, Wolters Kluwer/Lippincott, 2010), *Parkinson's Disease: A Complete Guide for Patients and Family* (2nd edition, Hopkins University Press, 2007), and *Handbook of Clinical Neurology Hyperkinetic Disorders* (Elsevier, 2011); has received research support from Novartis, Santhera Pharmaceuticals, and Boehringer Ingelheim; and has provided expert testimony and served as a subject matter expert in legal proceedings.

The AAN Guideline Author Conflict of Interest Policy can be viewed at www.aan.com.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Zesiewicz TA, Elble R, Louis ED, Hauser RA, Sullivan KL, Dewey RB Jr, Ondo WG, Gronseth GS, Weiner WJ. Practice parameter: therapies for essential tremor: report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology 2005 Jun 28;64(12):2008-20.

Guideline Availability

Electronic copies: A list of American Academy of Neurology (AAN) guidelines, along with a link to a Portable Document Format (PDF) file for this guideline, is available at the AAN Web site.

Print copies: Available from the AAN Member Services Center, (800) 879-1960, or from AAN, 201 Chicago Avenue South, Minneapolis, MN 55415.

Availability of Companion Documents

The following are available:

- Update: treatment of essential tremor. AAN summary of evidence-based guidelines for clinicians. St. Paul (MN): American Academy of Neurology. 2011. 2 p. Electronic copies: Available in Portable Document Format (PDF) from the AAN Web site.
- Update: treatment of essential tremor. Case presentation. St. Paul (MN): American Academy of Neurology. 2011. 4 p. Electronic copies: Available in PDF from the AAN Web site.
- Update: treatment of essential tremor. Slide presentation. St. Paul (MN): American Academy of Neurology. Available as a PowerPoint file from the AAN Web site.
- Patient exhibiting essential tremor. Video. St. Paul (MN): American Academy of Neurology. Available from the AAN Web site.
- Treatment of essential tremor. CME course. Available online to subscribers of *Neurology* at the Neurology Web site.
- AAN guideline development process [online]. St. Paul (MN): American Academy of Neurology. Available from the American Academy of Neurology (AAN) Web site.

Patient Resources

The following is available:

- Treatment of essential tremor. AAN summary of evidence-based guideline for patients and their families. St. Paul (MN): American Academy of Neurology (AAN). 2011. 4 p. Electronic copies: Available in Portable Document Format (PDF) from the AAN Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide

specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI on July 26, 2005. The information was verified by the guideline developer on August 19, 2005. This summary was updated by ECRI on January 18, 2006, following the U.S. Food and Drug Administration advisory on Clozaril (clozapine). This summary was updated by ECRI on February 16, 2006, following the FDA advisory on Nimotop (nimodipine). This summary was updated by ECRI Institute on May 1, 2009 following the U.S. Food and Drug Administration advisory on antiepileptic drugs. This summary was updated by ECRI Institute on May 26, 2009, following the U.S. Food and Drug Administration advisory on Botox, Botox Cosmetic (Botulinum toxin Type A), and Myobloc (Botulinum toxin Type B). This summary was updated by ECRI Institute on August 17, 2009, following the updated FDA advisory on Botox and Botox Cosmetic (Botulinum toxin Type A), and Myobloc (Botulinum toxin Type B). This NGC summary was updated by ECRI Institute on December 22, 2011.

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